Compulite R & D

Lighting Specification

Sabre

Computerized Lighting Console

October 1999

A. General

1. The lighting control console shall be microprocessor based and specifically designed to provide complete lighting control of stage, studio, special events, and permanent installation venues. The lighting control system shall be equal to a Compulite Sabre lighting control console as manufactured by Compulite R & D. A rack mounted component providing full tracking backup and a Remote control unit shall also be available.
2. Flash EPROM shall be provided to permit onsite upgrades.
3. The control console shall include, but not be limited to the following. Systems that do not provide the following features shall not be acceptable.

B. Quantities

1. The console shall provide direct control of up to 192 intelligent moving lights and 1,024 DMX 512 channels (255 channels shall be reserved for scrollers) and 1,024 dimmers.
2. More than 1,000 memories (cues) numbered from 0.1 to 999.9, 100 Q-Lists, 24 controllers with 99 pages (snaps) 999 Groups, 999 Macros, 999 Palettes, 999 Effects, 99 Position libraries, 99 Color libraries, 99 Gobo libraries, and 5 patches shall be stored in internal non-volatile memory.
3. The total non-volatile internal memory capacity shall not be less than 2 MB. Show files, Palette files, Effect files, and device files may be saved to an internal hard disk or archived to a 3.5” formatted floppy disk. Industry standard Intel Pentium microprocessors shall be standard.

C. Control Interface

1. The main controls shall consist of a numeric keypad, up to 20 pages of Numeric Soft Keys working in 14 modes, 1 vertical wheel for dimmer and pan control. 1 vertical wheel for iris, tilt, and scroller frame control, 6 encoders with backlit LCD displays for moving light parameter control and Effects attributes control, and a sensitivity adjustable trackball for moving light pan and tilt positioning.
2. Two pairs of faders shall be definable as split Crossfaders or Crossfader and Rate Fader.
3. 24 Controllers with 67-mm faders shall be provided. Each Controller shall be provided with a bump button, assignment type/ chaser control keys. 3 LCD selectable displays shall show assignments and controller status.
4. Two General Submasters shall master channels, spots, crossfaders, and controllers.
5. One General Master with blackout key shall be provided. The Channel Patch menu shall provided an option to remove channels from General Master control.
6. Up to 3 high resolution monitors shall be provided for system status displays. One of the monitors may be a Touch Screen. Additional monitors may be added on remote interfaces connected via Ethernet.
7. An optional alphanumeric keyboard shall provide text labeling and an alternative editing keyboard. The alphanumeric keyboard shall have multi-lingual support.

D. Displays

1. The console shall support 2 (optional 3) high definition color monitors, one of which may be a Touch Screen.
2. There shall be an option for LCD monitors.
3. The Stage Display shall show a color-coded display of the current output for spots and channels. The Playback Display shall show the current and next memories on the Crossfaders, Controller assignments, and the Priority line up. The XFade display shall show a graphic progression of the crossfade and a list of the next cues in sequence.
4. There shall be a topographical map of spot hanging positions.
5. There shall be Exam displays for: memory contents, memory track sheets, spots and channels. Lists of and specific Libraries, Snaps, Macros, Effects, groups, and Palettes shall be displayed. Playback status of Controllers and Crossfaders may also be displayed.
6. The Numeric Soft Key display shall be interactive with the Touch Screen.
7. A Swap Screen key shall be provided to exchange the display between monitors 1 and 2.
8. Display Macros shall provide quick access to customized Display formats.
9. Wheels and controllers shall have backlit LCD displays.

E. Software System overview

1. Software updates may be operator installed from 3.5” floppy disks. Changing internal components shall not be necessary.
2. There shall be built in on screen help for all panel keys.
3. Capacity shall be upgradable at any time to the maximum console configuration limitations.

F. Technical Specifications

1. Connectors
    a. DMX output 1
    b. DMX output 2
    c. DMX output 3
    d. DMX output 4
    e. DMX output 5
    f. DMX output 6
    g. VGA output 1
    h. VGA output 2
    i. VGA output 3 (optional)
    j. DMX input
    k. SMPTE input
    l. MIDI In/Out/Thru
    m. Remote bus
    n. Alphanumeric keyboard
    o. Serial port – RS232
    p. Mains power input

q. Mains power output (for monitors)
r. Ethernet 10 Mbit 10 Base2/10BaseT autoselect
s. Parallel printer port
t. 2 desklight connectors (+12v)

2. Dimensions and Electrical Information
   a. The console shall include a universal 100 – 240vac power supply.
   b. Total power consumption shall not exceed 250 VA (including monitors).
   c. The console shall be constructed from aluminum and aluminum extrusion and shall have a soft bolster for arm and wrist support.
   d. Dimensions:

      Width 127 cm (50″)
      Depth 50 cm (19.75″)
      Height 11 cm (4.5″)
      Weight 20 kg. (45 lb.)

3. Operating Environment
    a. The console shall operate in an ambient temperature range from 0° to 40°C (32° to 104°F).
    b. Operating location shall be protected from excessive dust and humidity.
4. Standards compliance
    a. The console shall be in compliance with CE standards.

G. System Configuration

1. Service Tools shall access basic system configuration. The system configuration shall be protected by a password.
2. Additional defaults shall be operator definable in the system Parameters menu. The system defaults shall include, but not be limited to, memory time, real time clock and date, Reset fade, number of Autosave generations retained, MIDI in/out, MIDI Show control, and MIDI sync channels.

H. Programming

1. Moving Light Control
    a. Moving lights (also known as spots) shall be patched to a control channel. Selecting the control channel shall access all of the spot parameters.
    b. Spots shall be selected using the numeric keypad, with→, +, -, &, and Except syntax. Spot selections shall also be possible on the Numeric Soft K6eys in Spot mode, through pre-programmed groups, by selection of active spots visible on stage, or by selections of spots from memories. There shall be a shortcut to recall the last selection.
    c. Parameter value assignments shall be made using parameter selection keys and the numeric keypad or the parameter selection keys and the parameter wheels. It shall be possible to copy value assignments from the editor, from Libraries, or from memories.
    d. Spot parameters shall be assigned to one of 6 parameter control wheels. Each wheel shall have 4 dedicated parameter keys for rapid parameter selection. Parameters shall be further organized in 6 quick selection banks - I, F, C, B, 1, 2. Pan and tilt may be controlled by the trackball, wheels, or the joystick.
    e. Spot parameters may be defined as continuous, discrete step, or mixed step.
    f. There shall be support for 8 and 16-bit control for all parameters.
    g. There shall be 99 Position libraries, 99 Color libraries, and 99 Gobo libraries for use as a tracking database for programming memories. Libraries shall be selected on the Numeric Soft Keys in Position, Color, or Gobo modes. Libraries may be assigned text labels.
    h. A Leader function shall be provided. This function shall permit some spots (followers) to duplicate the apparent position of another spot (leader) in true time or with absolute or relative delay times. The Leader function shall support a Change Venue option for globally updating position information.
2. Channel control
    a. Channels shall be selected using the numeric keypad, with→, +, -, &, and Except syntax. Selections shall also be possible through pre-programmed

groups, by selection of active channels visible on stage, or by selection of channels from memories. There shall be a shortcut to recall the last selection.

b. Intensity levels shall be set using the @ key to assign an absolute value on the numeric keypad or by using the Dimmer Wheel. There shall be dedicated keys for Full and Zero intensity assignments. It shall be possible to copy intensity assignments from the editor or from memories.

3. Scroller Control
   a. There shall be a menu provided for patching Scrollers to dimmer control channels of associated fixtures. Scroller patching shall provide single channel selection for the dimmer and scroller of a fixture.
   b. A Frame key shall provide absolute frame value assignment. A frame wheel shall provide relative frame value assignment.
   c. Scroller frame assignments shall be displayed and tracked throughout the show.
   d. The Scroller Patch menu shall provide options for dark gel assignments to extend the life of dark color gels and frame adjustment.
4. Memories (cues)
   a. Memories may contain channels, scrollers, spots, and selected spot parameters. Each memory may be assigned time-in, time-out, delay, wait-in, and wait-out fade times. Memories may be assigned text labels.
   b. The system shall support up to 100 separate Q-Lists. Each Q-List shall be an independent memory domain containing memories numbered from 0.1 to 999.9. All playback devices shall accept Q-List assignments. Q-Lists shall support embedded sub-routines.
   c. Memories may have up to 9 parts. Parts may contain channels, scrollers, spots, or selected spot parameters. Each part of a memory may have unique fade times.
   d. Memories shall support Loop, Link, and Event assignments.
   e. Memories may be assigned SMPTE codes for operation through SMPTE triggers.
5. Storing and modifying data
   a. Memories, Groups, Snaps, Effects, Palettes, Display Macros, and Libraries shall be programmed, stored, and updated in the editor.
   b. A quick memory modification sequence shall be provided for modifying memories during playback.
   c. It shall be possible to update libraries when modifying memories during playback.
   d. Filters may be programmed with groups of channels, spots, and spot parameters. Filters may be assigned to the editor or playback devices and shall be used to override the output from the editor or active playback devices. Filters shall have 2 function modes: filter and invert filter.
   e. There shall be a modification tracking function.
6. Groups
   a. Up to 999 Groups of commonly used channels, spots, and scrollers may be recorded for fast recall.

   b. Groups shall be selected on the Numeric Soft Keys in Group mode or on the number keypad.
   c. Groups may be assigned text labels.
7. Palettes
   a. The system shall support 999 Palettes, non-tracking database of spot parameter values, channels intensity values, and scroller frame values. Palettes shall serve as a database for assigning values to the active editor selections. Palettes may contain parameter values for all types of moving lights, channel intensity values, and scroller frame values. Pre-programmed Palettes shall be provided. Palettes may be operator defined. Each Palette may have a text label.
   b. Palettes may be selected using the numeric keypad or the Numeric Soft Keys in Palette mode.
   c. Palettes shall be stored with the show file and in a separate Palette only file.
8. Effects
   a. Up to 999 text labeled Effects may be loaded from an Effect files or operator defined.
   b. The Effects editor shall provide options for modifying canned Effects and creating custom Effects. Effects shall be composed of building-block functions and function attributes, which may be applied to any combination of spot parameters, channel dimmers, and scroller frames.
   c. Discrete fade rates shall be programmable for each unit participating in the Effect.
   d. Preprogrammed and custom Effects shall be stored on the hard disk. Effect files shall be part of the show file. The console shall provide an option to record independent Effects files.
   e. Each Effect may have a text label.
   f. Effects shall be accessed via the Numeric Soft Keys in Effect mode or on the number keypad.
9. The console shall support 2 (optional 3) high definition color monitors, one of which may be a Touch Screen.
10. There shall be an option for LCD monitors.
11. The Stage Display shall show a color-coded display of the current output for spots and channels. The Playback display shall show the current and next memories on the Crossfaders, Controller assignments, and the Priority line up. The XFade display shall show a graphic progression of the crossfade and a list of the next cues in sequence.
12. There shall be a topographical map of spot hanging positions.
13. There shall be Exam displays for: memory contents, memory track sheets, spots and channels. Lists of and specific Libraries, Snaps, Macros, Effects, groups, and Palettes shall be displayed. Also playback status of Controllers and Crossfaders.
14. The Numeric Soft key display shall be interactive with the Touch Screen.
15. A swap CRT option shall be provided.
16. Display Macros shall provide quick access to customized Display formats.
17. Wheels and controllers shall have backlit LCD displays.

I. Playback

1. Four 100-mm Crossfaders shall be user definable as 2 split crossfaders or 2 crossfaders and 2 rate faders. Crossfaders shall have LED displays for memory sequence, illuminated go buttons, dedicated control keys for Back, Hold, Multifade and Automatic Sequencing. For moving lights, Crossfaders shall operate in latest action takes precedence or operator definable control hierarchy; for channels they shall operate on a Highest Takes precedence basis. Crossfaders shall operate in Automatic or Manual fades, executing Loops, Links, subroutines, and Events.
2. 24 Controllers shall be provided. Each Controller shall include a 67mm fader, a bump button, and assignment/chaser control keys. LCD selectable displays shall show assignments and Controller status. Each Controller shall support individual spot or channel assignments, spot parameter assignments, group assignments, memory assignments, chaser assignments, Effect assignments, or inhibitive assignments and shall process automatic or manual operations. Controllers may be joined together for simultaneous operation from a single key. Effects may be joined together for global rate modification. For moving lights, Controllers shall operate in latest action takes precedence or operator definable control hierarchy; for channels they shall operate on a Highest Takes precedence basis.
3. Chases may be assigned to Controllers to playback in Hard or Soft run mode. Chases shall consist of a sequence of memories. In hard mode chases will step between memories. In soft mode chasers will fade between memories. Chasers may receive automatic GO commands or may be stepped through manually. Chases may be joined to respond to single press playback commands.
4. Effects may be assigned to controllers to playback in Hard or Soft run mode.
5. There shall be a dedicated rate control wheel for Chaser and Effect rate override. It shall be possible to store modified rates.
6. The Join feature shall join chasers on controllers for overall Go, Hold, and Step commands. The Join feature shall join Effects on controllers for global run rate modification via the Chase Rate option.
7. 99 Snaps may be programmed for playback device assignments. Snaps shall include all panel assignments and assignment modes.
8. Playback sequences, including C/D fader, chaser assignments, and macro operations, may be stored as Events and assigned to specific memories. Events assigned to memories shall be executed when the associated memory sequences on the A/B crossfader.
9. Playback devices shall work in mapped or LTP playback device priority. Priority maps shall be programmed in the Device Priority menu. Playback devices may be grouped under the same priority code. Control hierarchy shall be displayed with the controller displays. Priority maps shall be saved with Snaps.
10. Over 1,000 Events (0.1 - 999.9) may be programmed to initiate complex playback routines and Macro triggering. Events may be operated in the editor, assigned to memories sequencing on the A/B crossfader, or triggered using SMPTE time codes.
11. Spots may be assigned to the joystick for independent control of pan and tilt.
12. There shall be a LookAhead/ForceBlack feature to enable spot parameter and scroller moves to occur under blackout.

J. Patch menus

1. The Channel Patch menu shall support, but not limited to, channel to dimmer assignment, dimmer curve options, and enabling/disabling General Master control.
2. The Scroller Patch menu shall support, but not limited to, patch scrollers to DMX addresses and control channels, adjust the frame set up, assign the dark gel function, disabling selected scrollers, and copying scroller set up.
3. The Mix Output menu shall control moving light management. It shall include, but not limited to, standard spot definitions, connector patching, patching to DMX addresses or proprietary protocol. A default device list shall be provided and a pool of spot definitions shall be provided for the operator to create a custom device list. Spot definitions may be edited and new device definitions may be entered. Spot definitions may be recorded to the hard disk or stored on a floppy disk and loaded as needed.
4. There shall be a Spot menu to permit assigning pan and tilt to in a manner consistent with the trackball movement, regardless of the physical orientation of the device.
5. Interactive on-screen prompts shall guide the operator through all of the menu functions.

K. Macros

1. Up to 999 Macros of up to 40 keypresses each may be recorded. Macros may contain additional nested Macros to increase the number of available keypresses.
2. Macros may be operated by number, on the Numeric Soft Keys in Macro mode, triggered in Event, or through DMX input from an external source.

L. Archive Storage of Data

1. Show archives of 2MB compressed data may be recorded to an internal hard drive, floppy, or file server (via Ethernet).
2. There shall be an Autosave function that automatically saves all the current system data at pre-determined intervals. The number of Autosave generations may be operator defined in the System Parameters menu. Autosave generations may be locked. Autosave generations may be used to restore a show at any time.
3. Autosave shall not interfere with normal console operation.
4. Disk management shall permit loading the entire show file, QLists only, libraries only, patch tables only, mix output only, macros only or leader set up only.
5. Effect and Palette files shall be saved in show files and/or as independent Effect and Palette files.
6. Device definition files shall be saved to the Hard disk and/or floppy disks.

M. Printing

1. The system shall support a wide range of printers.
2. Printouts may be requested for Libraries, Patches, memory list, memory contents, Macros, and free channels.
3. Any display may be printed using Print Screen on the alphanumeric keyboard or a specially provided Print macro.

N. Communications

1. Ethernet
    a. There shall be full support for an extensive Ethernet network, remote file server, remote video (VideoLINK and CompuLINK), and DMX/Ethernet routing (E-Mix and CompuLINK). It shall be possible to record and load show files from the File Server.
2. DMX input
    a. There shall be a DMX input port for conventional channels or moving lights. DMX input may be integrated with the main console output to program memories. Macros with selectable operation threshold may be operated from DMX input data. DMX input channels may also be used as playback device submasters.
3. MIDI
    a. The console shall read note commands from any MIDI source and shall generate MIDI commands.
    b. The console shall support MIDI via Ethernet.
    c. The console shall support MIDI Show Control.
    d. The MIDI sync function shall facilitate playback tracking between two consoles.
4. SMPTE
    a. The system shall receive SMPTE transmission to operate Events or fade memories on the crossfaders.
    b. There shall be an internal SMPTE clock.
    c. SMPTE time codes may be assigned to Events and memories using a ‘teach me’ function or by manually editing the time code information.
5. CompuCAD
    a. The system shall support show files programmed on CompuCAD.
6. WYSIWYG
    a. The console shall support WYSIWYG 2.0, WYSIWYG 3.0 and Ethernet for real time simulation.
    b. WYSIWYG feedback to the console shall be through the MIDI port.
    c. The operator may select spots/channels and enter dimmer/parameter values.

O. Backup

1. A 19” rack mount system shall provide back up for the lighting console’s processor unit.
    a. The Backup system shall track the main console and shall automatically take over if needed. The console keyboard shall remain active when the Backup unit is operating.
    b. The Backup system shall contain integrated outputs, which shall merge with the main console’s outputs.
2. Serial connection to PC
    a. The console may be connected, through a serial port, to any system that transmits RS232. The PC may then be used to execute macros, snaps, and events. Execution via the PC may be immediate or delayed. In delay mode all the commands sent shall be saved and executed upon operation command sent

from the PC. Key mapping allows the PC to simulate the Sabre control panel keys.

P. Peripherals

1. Submaster Wing
    a. Support shall be provided for a Submaster Wing. The Submaster Wing shall provide 20 additional controllers with illuminated bump buttons, function keys, and a 2 x 40 character alphanumeric display. Channel, scroller, spot, and memory assignments may be assigned to the Submaster Wing. The controllers on the Submaster Wing may also function as inhibit submasters.
2. Macro Extension Keyboard
    a. Support shall be provided for the Macro Extension Keyboard. The Macro Extension Keyboard shall provide direct access to all (999) macros.
    b. The Macro Extension Keyboard shall have individual illuminated LEDs and an alphanumeric display that shall show the macro text.
3. Universal Remote Control
    a. A Universal Remote Control shall be available in cabled or wireless versions. The Universal Remote Control shall have a 2 line 16-character display, keyboard, and trackball.
    b. The Universal Remote control shall provide full editing capability for moving lights and conventional channels. Memories may be programmed and modified and macros may be operated.